

What is claimed is:

1. A leakage determination system for an evaporative fuel processing system that causes a canister to absorb evaporative fuel generated from a fuel tank and supplies the evaporative fuel absorbed in the canister to an intake system of an internal combustion engine,

the leakage determination system comprising:

pressure detection means for detecting pressure within the evaporative fuel processing system;

pressure reduction means for reducing the pressure within the evaporative fuel processing system until the detected pressure within the evaporative fuel processing system becomes equal to a predetermined negative pressure, by introducing negative pressure from the intake system;

negative pressure introduction means for introducing the negative pressure from the intake system into the evaporative fuel processing system under predetermined conditions after the pressure reduction by said pressure reduction means; and

leakage determination means for determining whether or not there is a leak in the evaporative fuel processing system, based on a state of the pressure within the evaporative fuel processing system, which has been detected during the introduction of the negative pressure from the intake system by said negative pressure introduction means.

2. A leakage determination system according to claim 1, wherein said negative pressure introduction means introduces the negative pressure from the intake system at a predetermined constant negative pressure

2025 RELEASE UNDER E.O. 14176

introduction flow rate.

3. A leakage determination system according to claim 1, wherein said negative pressure introduction means includes pressure re-reduction means for holding the evaporative fuel processing system in a closed state and introducing the negative pressure from the intake system whenever the pressure within the evaporative fuel processing system rises to a predetermined pressure higher than the predetermined negative pressure, to thereby repeatedly reduce the pressure within the evaporative fuel processing system to a second predetermined negative pressure lower than the predetermined pressure, and

wherein the leakage determination system further comprises pressure reduction cycle detection means for detecting a pressure reduction cycle of the pressure reduction performed by said pressure re-reduction means, and

said leakage determination means determining whether or not there is a leak in the evaporative fuel processing system, based on a plurality of pressure reduction cycles detected by said pressure reduction cycle detection means.

4. A leakage determination method for an evaporative fuel processing system that causes a canister to absorb evaporative fuel generated from a fuel tank and supplies the evaporative fuel absorbed in the canister to an intake system of an internal combustion engine,

the leakage determination method comprising:

- a pressure detection step of detecting pressure within the evaporative fuel processing system;
- a pressure reduction step of reducing the

pressure within the evaporative fuel processing system until the detected pressure within the evaporative fuel processing system becomes equal to a predetermined negative pressure, by introducing negative pressure from the intake system;

a negative pressure introduction step of introducing the negative pressure from the intake system into the evaporative fuel processing system under predetermined conditions after the pressure reduction at the pressure reduction step; and

a leakage determination step of determining whether or not there is a leak in the evaporative fuel processing system, based on a state of the pressure within the evaporative fuel processing system, which has been detected during the introduction of the negative pressure from the intake system.

5. A leakage determination method according to claim 4, wherein at said negative pressure introduction step, the negative pressure from the intake system is introduced at a predetermined constant negative pressure introduction flow rate.

6. A leakage determination method according to claim 4, wherein at said negative pressure introduction step, the negative pressure is introduced from the intake system while holding the evaporative fuel processing system in a closed state whenever the pressure within the evaporative fuel processing system rises to a predetermined pressure higher than the predetermined negative pressure, whereby the pressure within the evaporative fuel processing system is repeatedly reduced to a second predetermined negative pressure lower than the predetermined pressure,

wherein the leakage determination method further

comprises a pressure reduction cycle detection step of detecting a pressure reduction cycle of the pressure reduction at said negative pressure introduction step, and

wherein said leakage determination step includes determining whether or not there is a leak in the evaporative fuel processing system based on a plurality of detected pressure reduction cycles.

7. A recording medium storing a leakage determination control program for causing a computer to carry out leakage determination for an evaporative fuel processing system that causes a canister to absorb evaporative fuel generated from a fuel tank and supplies the evaporative fuel absorbed in the canister to an intake system of an internal combustion engine,

wherein the leakage determination control program causes the computer to detect pressure within the evaporative fuel processing system, reduce the pressure within the evaporative fuel processing system until the detected pressure within the evaporative fuel processing system becomes equal to a predetermined negative pressure, by introducing negative pressure from the intake system, introduce the negative pressure from the intake system into the evaporative fuel processing system under predetermined conditions after the pressure reduction to the predetermined negative pressure, and determine whether or not there is a leak in the evaporative fuel processing system, based on a state of the pressure within the evaporative fuel processing system, which has been detected during the introduction of the negative pressure from the intake system.

8. A recording medium according to claim 7,

wherein the leakage determination control program causes the negative pressure to be introduced from the intake system at a predetermined constant negative pressure introduction flow rate, after the pressure reduction to the predetermined negative pressure.

9. A recording medium according to claim 7, wherein the leakage determination control program causes the negative pressure to be introduced while causing the evaporative fuel processing system to be held in a closed state, after the pressure reduction to the predetermined negative pressure, whenever the pressure within the evaporative fuel processing system rises to a predetermined pressure higher than the predetermined negative pressure, thereby repeatedly reducing the pressure within the evaporative fuel processing system to a second predetermined negative pressure lower than the predetermined pressure, detecting a cycle of the pressure reduction, and determining whether or not there is a leak in the evaporative fuel processing system, based on a plurality of detected pressure reduction cycles.